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U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE  
CALIFORNIA FOREST AND RANGE EXPERIMENT STATION

LODGEPOLE NEEDLE MINER CONDITIONS  
SEQUOIA-KINGS CANYON NATIONAL PARK  
AUGUST 1958  
RECONNAISSANCE SURVEY

by

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During August, a reconnaissance survey was made of four areas in the Sequoia-Kings Canyon National Park, where infestations of the lodgepole needle miner, Recurvaria milleri Busck had been reported. The areas surveyed were Woods Creek, Big Arroyo, Hockett Meadows and Kern-Kaweah River. They were examined during August 18 to 28, 1958, by G. C. Trostle, entomologist and Robert Rennie, assistant from the California Forest and Range Experiment Station. Accompanying the party on the inspection of Woods Creek were Maurice Thede, Regional Forester and Warren F. Steenbergh (Scotty), Ranger for the National Park Service.

The lodgepole needle miner was first collected in the Sequoia area near Mineral King Hotel in 1923. It was first officially reported from Sequoia-Kings Canyon Park by Donald DeLeon in 1935.<sup>1/</sup> He found five areas of needle miner work: 1. Infestations were "common in the Big Arroyo in stands north of the control cabin at the junction of Little Five Lakes trail" and "evident of old kill perhaps 30 years old." 2. "No needle miner work was observed on the Chagoopa Plateau below the cutoff to the Kern from the Moraine Lake trail. This would infer that there was infestation above this trail junction. 3. Extremely light "work of the needle miner was present in the Kern and along Rattlesnake Creek to upper meadow." 4. "At Mineral King the infestation remains severe." 5. "On the Timber Gap trail to Redwood Meadow, miner work was found on the north side of the pass."

In 1938, Frank Been first reported the presence of needle miners in the Kern-Kaweah River area.<sup>2/</sup> He found an area of 1/2 square mile infested in the basin formed by the Kern-Kaweah River and Picket Creek. He reported: "Although the attack is severe, there are not many dead trees, but practically all the trees are badly hit...."

Senior Entomologist J. M. Miller stated that the Kern-Kaweah infestation is a new locality record and is perhaps part of an infestation on the Chagoopa Plateau which has persisted for many years." In this same report S. T. Carlson reported the Mineral King infestation to be very active and although a few mined needles were found at Hockett Meadows, no active larvae could be found.

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<sup>1/</sup> DeLeon, Donald, Memorandum for Acting Park Forester Been re: insect reconnaissance of Chagoopa Plateau and adjacent areas. Berkeley, Calif. 1935,

<sup>2/</sup> Been, Frank, Sequoia National Park, Annual Forest Insect Report, November 15, 1938.

W. B. Augustine reported in 1939 (a flight year)<sup>3/</sup>: "I would say that the trees (in the small basin west of Rock Slide Lake on the Kern-Kaweah River) have been about half defoliated. A half-hour investigation failed to show that an active infestation was in progress.... The usual associate of the needle miner, the mountain pine beetle, was not observed. Area of infestation is about 40 acres."

"There is a very light needle miner infestation in lodgepole pine at Mineral King...."

Since this report was made when there were no larvae, it is difficult to know if the infestation actually dropped in 1939 or if it was only thought to be light because there were no larvae. However, this is the last report from the Mineral King area.

Needle miner activity in Woods Creek was first reported in the 1948 annual report for Sequoia-Kings Canyon National Park.<sup>4/</sup> In 1950, Park Forester C. E. Johnson reported that he knew of only two infestations - Woods Creek and Kern-Kaweah. The most recent report of needle miner activity was made by Stevens after he visited Woods Creek in 1955.<sup>5/</sup>

An inventory of areas of possible infestation was considered necessary in 1958 because of the incomplete history of needle miner activity in them. It was thought that this reconnaissance might also reveal something about natural controls that have kept the outbreaks from becoming more severe. The survey was one of several made in 1958 to appraise lodgepole needle miner infestations throughout the State. The purpose of the survey was to determine what areas were infested, and if the infestations were following similar trends to the needle miner infestations at Tuolumne Meadows, Yosemite National Park.

### Insect and Host Species

The defoliator involved in this survey is the lodgepole needle miner, feeding on lodgepole pine. This moth has a 2-year life cycle, flying in odd-numbered years only. Defoliation is more pronounced after midsummer of the even-numbered years, when the larvae begin to mature and consume a maximum amount of foliage.

Lodgepole is the exclusive host of this moth, although larvae have been found feeding on other coniferous foliage such as red fir, mountain hemlock and western white pine after they have completely defoliated the adjacent lodgepole. The largest lodgepoles are the most severely defoliated. Understory lodgepole may also be defoliated, but young stands seem to have a greater capacity to survive than do mature stands.

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<sup>3/</sup> Augustine, W.B. Annual Forest Insect Report, Sequoia National Park, 1939.

<sup>4/</sup> Scoyen, E.T. Annual Forest Insect Control Report for Sequoia-Kings Canyon National Park, 1948.

<sup>5/</sup> Stevens, R.E. Lodgepole needle miner, Sequoia-Kings Canyon National Park, September 1955, Reconnaissance Survey, Berkeley, Calif. Nov. 1955.



The lodgepole within the Sequoia-Kings Canyon Park usually occurs in relatively small, pure stands, surrounded by a wide band of lodgepole mixed with western white pine, Jeffrey pine, fox tail pine and true firs. Stands are often separated by steep elevational changes and expanses of bare rock. There is very little evidence of recent fires or insect depredations so that the stands are made up mostly of overmature trees 20 inches d.b.h. and over. The stands are notably healthy for lodgepole; the usual snags and down logs are scarce and at times completely absent.

Mountain pine beetle activity (both currently and in the past) has been uncommonly low. The Hockett Meadows area was the only area where much past activity was seen. This bark beetle is commonly associated with the needle miner and often develops successfully in defoliated trees. In Yosemite National Park it has built up large populations which have caused widespread damage. However, in none of the Sequoia-Kings Canyon Park areas covered by this survey was any current bark beetle infestation seen.

#### Infestation Area

The four areas of reported infestations are as follows: 1. Woods Creek; 2. Big Arroyo; 3. Hockett Meadows; 6/ 4. Kern-Kaweah River (see map). Woods Creek is one of the main forks of South Fork Kings River, while the Kern-Kaweah River flows east from Triple Divide Peak to join the Kern River at Junction Meadows. The Big Arroyo is a major fork of the Kern River about 15 miles long and contains a large volume of lodgepole pine. Hockett Meadows is another large area containing a great deal of lodgepole, on relatively flat land between two forks of the Kaweah River southwest of Mineral King.

#### Status of the Infestation

Needle miner infestations were found in only two of the four areas surveyed. These were Woods Creek and Kern-Kaweah River. The Woods Creek infestation was heavier than the one in Kern-Kaweah River. Defoliation in Woods Creek was comparable to that in the area north of Tuolumne Meadows, Yosemite National Park. Trees were heavily defoliated with 70 to 100 percent of the current needles mined. If defoliation of this magnitude continues, tree mortality will likely begin within a few more years. In traveling up Woods Creek, it was found that the infestation begins with the lodgepole type, at about 8,300 feet. Defoliation was found from this elevation up the main Woods Creek drainage and the South Fork drainage to about the 9,500-foot level where the lodgepole type ends. This upper limit of the type is about 1/2 mile above White Fork on the main Woods Creek and just about Baxter Creek on the South Fork of Woods Creek. The infested area is probably seldom over a quarter of a mile wide and probably 5 miles long, a total of 700 to 800 acres. Some evidence of past mountain pine beetle was seen, but no current activity was evident.

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6/ Hockett Meadows has been referred to in previous reports as Forest Creek-Hockett Meadows, whereas the Kern-Kaweah River infestation has been referred to as Gallat's Lake - a poorly chosen name since the area designated on the map is hardly recognizable as a lake.

The Kern-Kaweah River infestation exists in a mixed stand of lodgepole and western white pine 1/4-mile wide on the valley floor. The elevational limits are between 9,000 and 10,000 feet, beginning at Rock Slide Lake and extending up almost to Gallat's Lake. Most of the damaged lodgepole is mature, averaging about 16-18 inches d.b.h. This infested timber is completely isolated by open, non-timbered rock walls and covers an area of under 500 acres.

The Kern-Kaweah River infestation first appeared to be much worse than it really was. Small fires have killed groups of trees in the area giving them every appearance of being killed by defoliation. However, close examination showed a medium infestation similar to the one around the Tuolumne Meadows lodge. About 20 to 30 percent of the current needles were mined.

#### Discussion

The evidence from previous reports and from this survey indicates that the Woods Creek and Kern-Kaweah River infestations have probably both existed on a relatively small scale for at least 20 years. Except for the records of earlier observers, no evidence of past defoliation in adjacent stands of lodgepole was found. One can only speculate on the variations that may have taken place in these stands over the years. In both areas red fir and western white pine are common, and could possibly take over the site if the lodgepole were killed and mortality not too rapid.

The two needle miner infestations in the Sequoia-Kings Canyon National Park are quite similar to each other, but both are quite different from the more serious infestation in the Yosemite National Park. These differences are characterized as follows:

<u>Yosemite infestation</u>	<u>Sequoia-Kings Canyon Infestation</u>
1. Vast area infested covering 50,000 acres.	1. Two small areas infested covering a total of less than 2,000 acres.
2. Complete stands of pure lodgepole killed in past by combined infestations of mountain pine beetle and needle miner.	2. Little or no past tree mortality. Little mountain pine beetle activity.
3. Lodgepole usually in pure stands.	3. Lodgepole usually in mixed stands.

These differences in characteristics help explain why the Woods Creek and Kern-Kaweah infestations are relatively mild and non-aggressive whereas the Yosemite infestation is not. Unless the lodgepole stands in these two drainages suffer unexpected damage, any tree loss will probably be replaced by current growth. The character of the infestation is not expected to change noticeably over the next 5 years.

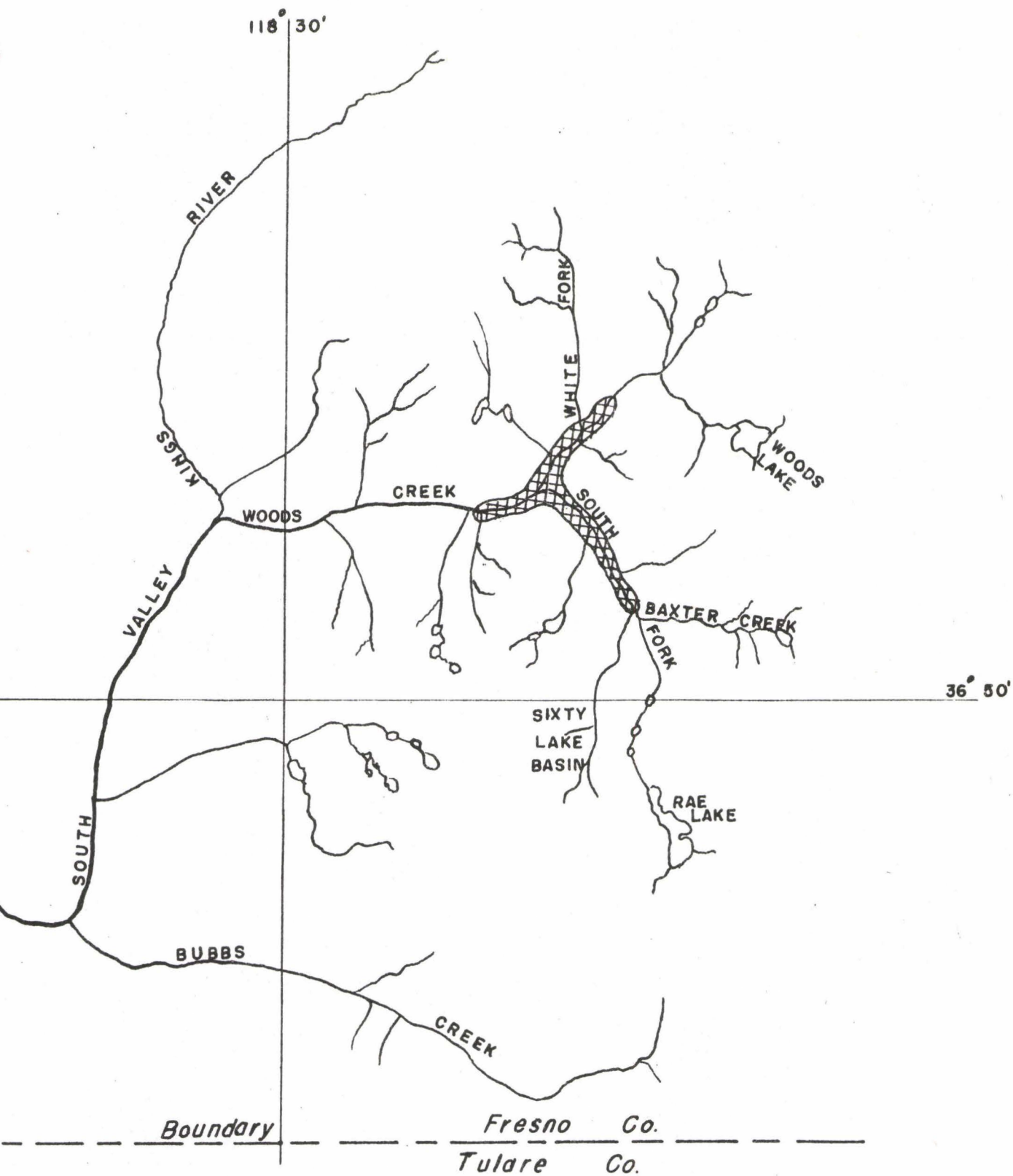
The areas where no infestations were found, Big Arroyo and Hockett Meadows, both have extensive lodgepole stands within the elevational range of the needle miner. Since the lodgepole in both localities is so extensive, small local infestations could have been overlooked, but unless the infestation was very light it probably would have been detected.



The written history indicates that the needle miner infestations in the Sequoia-Kings Canyon National Park and Mineral King area are subject to wide variations in intensity. It may be that the two areas now infested are remnants of an infestation which was once much larger. More intensive study of these small infestations might be worthwhile, for they may hold important clues to the solution of the needle miner problem.

Attachments: 2 maps

February 23, 1958<sup>9</sup>  
Berkeley, California



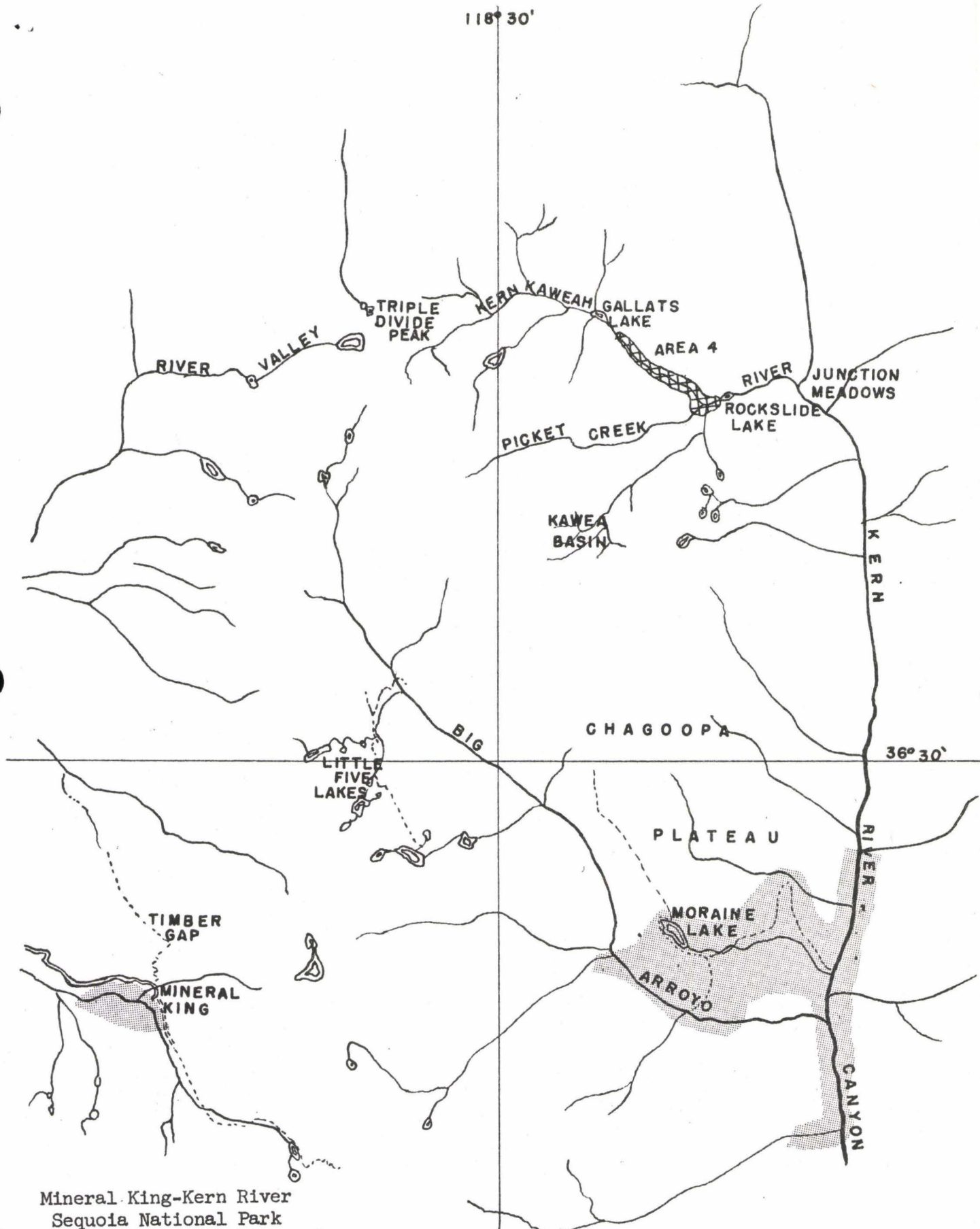
Woods Creek  
Kings Canyon National Park  
Reconnaissance Survey, 1958



Lodgepole needle miner infested area.

1 1/2 0 1 2

Scale: 1/2" = 1 mile



Mineral King-Kern River  
Sequoia National Park  
Reconnaissance Survey, 1958

1 1/2 0 1 2  
SCALE 1/2" = 1 MILE

Lodgepole needle miner infested area.

Uninfested lodgepole-type covered  
by reconnaissance.